Aktuelle Veranstaltungen

Kolloquium

Thema:	**Continuing to finite density - the QCD phase diagram with Lattice QCD**
Datum:	31.01.22
Uhrzeit:	16:15
Ort:	cyberspace
Vortragender:	Jana Günther Wuppertal University
Inhalt:	The QCD phase diagram is an important ingredient to understand both the development of the early universe and the results of resent heavy ion collision experiments. At zero baryon density lattice QCD is the established tool, that provides precise theoretical results. However, to explore the phase diagram at non-zero density new techniques are required to deal with the infamous sign problem. In this talk, I will take you along on our journey investigating the area around the QCD transition away from the zero density axis.
Ansprechpartner:	B. Brandt / TR211

Kolloquium Mathematische Physik

Thema:	**Quasicompact Operators and Uniquely Ergodic Dynamical Systems**
Datum:	04.02.22
Uhrzeit:	16:15

Ort: ZOOM/Konferenzschaltung

Vortragender: Neil Manibo

Open University, Milton Keynes

Inhalt: Primitive substitutions on finite alphabets are well studied objects in symbolic dynamics and are known to generate uniquely ergodic dynamical systems via the classical Perron--Frobenius theory. There is a similar notion of primitivity for substitutions on compact alphabets, but this no longer guarantees unique ergodicity. In this talk, we define the associated substitution operator, discuss its spectral properties, and give several criteria which guarantees unique ergodicity. We conclude by illustrating how it is satisfied for several classes of examples. This is based on joint work with Dan Rust and Jamie Walton.

Ansprechpartner: G. Akemann

Seminar Hochenergiephysik

Thema: **Gravitational Waves from Strong First-Order Phase Transitions**

Datum: 15.02.22

Uhrzeit: 14:15

Ort: Online, via ZOOM

Vortragender: David Weir

University of Helsinki

Inhalt: In many extensions of the Standard Model, the electroweak transition is first order - in some cases, strongly so. The ensuing phase transition would result in collisions of bubbles of the new Higgs phase. These collisions, and the associated interactions of sound waves in the plasma, are substantial sources of gravitational waves. For a phase transition at or around the electroweak scale, these gravitational waves may be detectable by future missions such as LISA. They can indirectly provide a probe of particle physics beyond the Standard Model, complementary to future colliders. However, concrete predictions of the resulting gravitational waves will require good understanding both of the particle physics models themselves, as well as the non-equilibrium physics of the transition. In other words, we need accurate studies of the phase diagrams in the underlying particle physics theories, as well as good predictions of the expected gravitational wave signal from simulations. These feed into

one another, forming a so-called 'pipeline'. The stronger the phase transition, the better the chance of being detected (or constrained) by future missions like LISA. However, strong transitions are also the most poorly understood. In this talk I will discuss some recent results from different points along the 'pipeline', with a focus on the consequences for strong first-order phase transitions.

Ansprechpartner: D. Bödeker

Seminar Kondensierte Materie

Thema: **Toroidale Momente in anisotropen Spinsystemen**

Datum: 21.01.22

Uhrzeit: 14:15

Ort: Hybrid - Zoom/D5-153

Vortragender: Daniel Pister

Universität Bielefeld

Inhalt:

Ansprechpartner: Jürgen Schnack

Seminar Mathematische Physik

Thema: **On Non-Hermitian Beta-Ensembles**

Datum: 14.10.21

Uhrzeit: 16:00

Ort: D5-153

Vortragender: Patricia Päßler

Universität Bielefeld

Inhalt:

Log-gases with inverse temperature beta are systems with many applications in physics, for example in the theory of superconductors or the fractional quantum Hall effect. For some specific values of beta a correspondence to random matrix theory (RMT) is well established. The advantage of this connection is the usage of the RMT methods in the study of those systems. The goal of this talk is the discussion of Log-gases in two dimensions, i.e. in the non-Hermitian case, for more general values of the inverse temperature. Therefore, we study in the first part a model of normal 2 × 2 matrices with beta in [0,2] and discuss whether we find a surmise for the nearest-neighbour spacing distribution of large matrices. In the second part of the talk we introduce the study of symmetry classes in non-Hermitian RMT. We conjecture that the classes of complex symmetric and complex quaternion matrices can be effectively described by Log-gases in two dimensions with non-integer inverse temperatures.

Ansprechpartner: Gernot Akemann

Seminar Bielefeld-Melbourne Zufallsmatrizen

Thema: **Symmetries and universality in the non-Hermitian Sachdev-Ye-Kitaev model**

Datum: 09.02.22

Uhrzeit: 09:00

Ort: ZOOM / Konferenzschaltung

Vortragender: Lucas de Barros Pacheco Seara de Sá

Tecnico Lisboa

Inhalt:

The non-Hermitian Sachdev-Ye-Kitaev model (nHSYK), a model of N strongly-coupled Majorana fermions with random all-to-all q-body non-unitary interactions, is receiving increasing attention because of its possible role as a paradigmatic solvable example of non-Hermitian quantum chaos. In this talk, I will discuss how its local level statistics are well described by (non-Hermitian) random matrix theory (RMT) for q>2, while for q=2 it is given by the equivalent of Poisson statistics. For that comparison, we combine exact diagonalization numerical techniques with tools from RMT, in particular complex spacing ratios. Depending on q and N, we identify 19 out of the 38 non-Hermitian universality classes in the nHSYK model, some of which involve universal bulk correlations of classes AI† and AII†, beyond the Ginibre ensembles. At the end, I will also address the probability distribution of the singular values of the nHSYK model, which, in the limit of a large number N of

Majoranas, can be related to the weight function of the Al-Salam-Chihara Q-Laguerre polynomials.

Ansprechpartner: Gernot Akemann